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the Determination of Work Hours

Working Paper No. 3638-93

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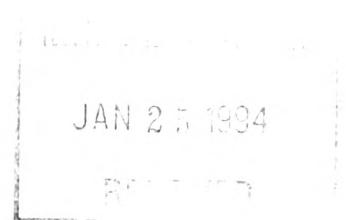
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**RAT RACE REDUX:
ADVERSE SELECTION IN THE DETERMINATION OF WORK HOURS**

by

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ABSTRACT

This paper makes the case for the importance of adverse selection in the determination of work hours in managerial and professional jobs. The focus of our investigation is large law firms. We argue that the income sharing that characterizes legal partnerships creates incentives to promote associates with propensities to work very hard. Since the *propensity* to work hard is unobservable, law firms rely upon *indicators* of this propensity, especially an associate's record of billable hours.

Using a simple adverse selection model, we demonstrate that the use of work hours as an indicator may lead firms to impose work norms entailing inefficiently long hours. In addition, we find that firms may *not* adjust these norms in response to an influx of employees desiring short hours. We find empirical support for our model with data we collect from two large law firms.

The logic of our model is not limited to professional partnerships. Adverse selection in hours may also be important in settings where there are strong complementarities among groups of professional employees (e.g. software production teams) or in competition for promotion to high level managerial positions.

1. Introduction

The United States' work force is in the midst of a demographic revolution. Over the past three decades, women entered the labor force at an unprecedented rate and they remained at their jobs even after they married and had children (Goldin, 1990). Women who are raising children and working outside the home will, all else equal, desire shorter work hours than their male counterparts from previous generations who typically had stay-at-home wives. The same may be true of the current cohort of men married to these working women. The labor market consequences of the sea change in workforce demographics will be determined, in large part, by the ways in which firms respond to increases in the number of employees desiring shorter hours.

Recently discovered trends in the historical evolution of work hours suggest some drift towards shorter hours, but the pace and direction of change varies across different education groups. Coleman and Pencavel (1993a, Table 14, p. 280) find a downwards cohort trend in weekly and annual hours for white men with 15 or fewer years of schooling over the period 1940-1988. In contrast, white men with 16 or more years of schooling exhibit a *positive* cohort trend for both these hours measures.¹ A parallel study by the same authors finds that annual hours trended downwards for white women with 15 or fewer years of schooling. Women with 16 or more years of schooling, like their male counterparts, display an upward trend in annual hours worked (Coleman and Pencavel, 1993b, Table 13, p. 667).²

¹ In this study, hours are the number of hours worked at all jobs for male wage and salary employees with positive earnings, and weeks worked in the year prior to the census. The hours trend described above appeared in a regression that controlled for changes in real GNP, cohort size, and average hourly earnings.

² These figures were calculated for female wage and salary employees who worked in the week and the year prior to the survey. Weeks worked included weeks of paid vacations and of paid sick leave. For less educated women, a downward trend in weekly hours was partially offset by increases in weeks worked per year, with the net trend in annual hours still being negative. For women with more than 16 years of schooling, there was no cohort trend in weekly hours, but there was a dramatic increase in the number of weeks worked per year (see Coleman and Pencavel, Table 13, p. 667).

According to textbook economic theory, market competition forces firms to link work hours tightly to the preferences of individual employees. Firms that more closely match the hours preferences of their employees will find that they can attract desirable employees at a lower wage. Conventional theory therefore predicts that most individuals will be working the utility maximizing number of hours (conditional on their wage). The reduction in work hours for less educated workers must then reflect an increase in the number of employees *wanting* reduced hours. Similarly, the high and increasing number of work hours for college educated employees must reflect their continued and increasing preference for long hours.³

The interpretation of the hours trends suggested by the conventional model depends heavily on the assumption that employers can directly observe the relevant characteristics of employees. In this paper, we show that when this assumption is violated, work hours may be determined through a process quite different from that described by the textbook model. In particular, firms may use long work hours (or other performance measures that entail long work hours) as an *indicator* of some valuable, yet hard to observe, characteristics of employees. If this indicator plays a role in determining hiring or promotions, then issues of adverse selection may appear in the determination of work hours. Employees desiring short hours will have an incentive to camouflage themselves as long-hour workers- perhaps by agreeing to more work hours than they would otherwise desire at their current wage. Firms will respond by establishing work norms with hours long enough to discourage a short-hour employee from pretending to be a long-hour employee. The result of this process is that employers may require too many work hours from employees. The employers also may not be able to quickly or easily adjust these hours as

³ For both men and women, annual hours worked were longer for college than for high school educated employees in 1988. Annual hours worked for college educated white men was 2,243 in 1988 and 1,909 for high school educated employees. For women the comparable figures are 1,797 and 1,531 respectively. For men, much of the difference between education groups was found at the upper tail of the weekly hours distribution. For women, much of the difference was found in the lower tail of the weekly hours and weeks worked per year distributions (Coleman and Pencavel, 1993a and 1993b Tables 3).

more short-hour employees enter the labor market. From this perspective, one of the causes of the divergence in hours between college educated and non-college educated workers described by Coleman and Pencavel, may be a greater incidence of adverse selection in the determination of work hours in high skill labor markets.

George Akerlof first proposed the idea that adverse selection can lead to overwork in his paper "The Economics of Caste and of the Rat Race and Other Woeful Tales" (Akerlof, 1976).⁴ Akerlof's demonstration that overwork equilibria are possible was presented in a self-consciously unrealistic numerical example. This created the unfortunate impression that the rat race equilibrium was an interesting theoretical example of market failure, but one having little connection to the operation of actual labor markets. In this paper we seek to make the case for the empirical relevance of rat race equilibria to a potentially large number of professional and managerial jobs. We do this by developing and testing a model of adverse selection in work hours for a *particular* type of business organization, large law firms.

It may seem incongruous to examine models with claims to broad applicability in such a narrowly defined setting. Large law firms, however, share two characteristics that make them a convenient vehicle for the study of adverse selection in work hours. First, law firms have a very simple internal structure. In general there are only two broad classes of professionals in the firm, associates, who are employees, and partners. The key promotion in the firm involves the decision to allow associates to purchase an equity stake in the enterprise.

The second important feature of law firms is that there is nearly always some degree of revenue sharing among partners (Gilson and Mnookin, 1985). The sharing of revenues among partners makes each individual partner's income dependent on the willingness of other partners in the firm to work hard. Since the money making activities of other partners are hard to observe

⁴ Holmström (1982) developed a similar idea in the context of a signaling model. Gale (1992) studied a model with both signaling and adverse selection processes. Rebitzer and Taylor (1993) describe equilibrium overwork in the context of an efficiency wage model.

directly, there are strong incentives to allow into the partnership only those associates with a *propensity* to work very hard.⁵

The propensity to work hard is not directly observable. Law firms therefore come to rely upon an indicator of work propensities, an associate's record of hours worked or, nearly equivalently, hours billed to clients. The use of hours as an indicator creates all the adverse selection problems discussed above. Indeed, we will demonstrate that short hour jobs may not be offered at all in legal partnerships and associates who prefer *long* hours will typically find themselves subjected to a work norm requiring them to work an inefficiently long number of hours. In these cases an increase in the proportion of short-hour attorneys in the labor force will have no effect on the number of short-hour jobs a law firm offers and may even cause firms to implement more stringent work norms.⁶

This last prediction is of particular importance for the study of lawyers because the legal profession has experienced a demographic revolution of its own. In 1967 women constituted about 3 percent of the attorneys in the United States.⁷ This figure fluctuated between 2 and 5 percent until 1975. By 1987, 16.2 percent of lawyers were female. Currently about 40 percent of the graduates from law schools are female (Rosen, 1992, Table 1, Figure 1 and p. 222). Adapting

⁵ As we discuss later in the paper, similar issues would appear when there are strong complementarities across co-equal employees in an organization, e.g. in the case of o-ring type production technologies described in Kremer (1993).

⁶ The argument in this paper is similar in some respects to that developed in Schor's recent bestseller, The Overworked American. We, like Schor, contend that competitive forces can lead to persistent overwork. We differ from Schor however in two important and interrelated ways. First, we attribute overwork to a specific microeconomic mechanism that is quite different than those implicit in Schor's writings. Secondly, our model suggests that overwork is most likely to appear in professional and managerial settings. Schor, in contrast, makes the claim that overwork is ubiquitous.

⁷ The first woman admitted to the bar in the United States was Belle Mansfield in 1869. Women generally found it difficult to obtain apprenticeships or admittance to law schools. Resistance to entrance at law schools was most pronounced in the elite East Coast schools. Columbia had an all male policy until 1927. Harvard began accepting women in 1949. The early cohorts of women in law schools frequently suffered blatant discrimination and harassment (Berger Morello, 1986).

to this shift in the labor force is a central issue for law firms. As Sherwin Rosen put it "...in many ways, the story of the legal profession... in the 1970's and 1980's is the entry of women; the huge increase in women ... represents one of the largest demographic changes ever observed in American professions" (Rosen, p. 222).⁸

The paper proceeds as follows: In the next section (section 2) we present a model of the determinants of work hours in a law firm where partners use hours as an indicator when making promotion decisions. In this setting it is easy to find cases where (1) associates work hours that are inefficiently long, and (2) firms will not offer short-hour jobs even as the number of attorneys desiring short hours in the workforce increases. In section 3 we offer an empirical investigation of our model using data we collected from two large law firms. In the conclusion we consider the relevance of rat race models to the determination of work hours in other professional and managerial settings.

2. Adverse Selection and The Determination of Work Hours

2.1 Attorneys and Firms

In this section we examine the determination of work hours in the context of a simple model. We suppose there are two types of attorneys. These attorneys are equally productive, and differ only with regard to preferences over leisure.⁹

8 The rapid influx of women throughout the 1980's does not seem to have depressed work hours. A 1984 survey of the legal profession found that 35 percent of lawyers in private practice worked 200 or more hours per month. A follow-up survey in 1990 found that 50 percent worked 200 or more hours per month (American Bar Association, 1991, p.22 Table 19). This same survey found that part-time or reduced hour work was most common for attorneys in a solo practice. Roughly 23 percent of lawyers in solo practice work part-time and reduced hours compared to 7 percent for junior assistant attorneys and 3 percent for partners (American Bar Association, 1991, Table 28, p.26).

9 Throughout this paper we follow the conventional practice of referring to non-market work activities as leisure. It should be clear, however, that our usage of the term leisure includes such important and non-leisurely activities as child and elder care.

All attorneys participate in the labor market for two periods. In each period utility is a function of consumption, c , and hours worked, h . Consumption in the period is always equal to that period's earnings. The discount rate is r . For simplicity we specify utility in a period to be

$$(1) \quad u_t(c, h) = c - b_t h^2$$

where $t=1$ or 2 indexes the individual's type. We let $b_1 > b_2$, so that type-2 individuals place a lower weight on the disutility of work than do type-1 individuals.

There are two distinct ways in which legal services can be produced. Attorneys can always work in a spot market (e.g., self employment) in which an hour of work results in the production of m_1 units of output. In a competitive spot market the wage will be $w_1 = m_1$. Given the specified utility function, optimal work hours for each type t will be

$$(2) \quad h_t^* = \frac{w_1}{2b_t},$$

as illustrated in Figure 1. At the optimal hours, h_t^* , and consumption, $c_t^* = w_1 h_t^*$, utility for individuals working in the spot market can be written

$$(3) \quad u_t(c^*, h_t^*) = \frac{w_1^2}{4b_t}.$$

The second way in which legal services can be produced is somewhat more involved. We imagine that there are some aspects to the production of legal services that are best accomplished by attorneys working in small teams, and we suppose that there are a limited number of such partnerships in the market. One might think of them as an *oligopolistic fringe* to the otherwise competitive market for legal services. Partnerships will exist only if output per hour for the partners is higher in this setting. We assume this to be the case and let output per hour for an individual working in the team be $m_2 > m_1$. As we will discuss shortly, partners hire additional attorneys as employees of their firm and these "associates" have productivity m_1 .

To keep notation manageable we will suppose that the optimal size of each partnership is two. For the moment, think of the two partners as having jointly purchased the partnership at the beginning of the period, with each paying X for his share. The partners agree to evenly divide output for the period and the revenue from the sale of the partnership at the beginning of the next

period. Once in a partnership, the optimal work decision for one partner, say individual A, is the solution to

$$(4) \max \frac{m_2}{2} (h_A + h_B) - b_A h_A^2$$

where h_B represents the hours chosen by the other partner.

Obviously, the return to being a partner in this context depends not only on an individual's type, but on the type of the other partner. This suggests that a partner will always prefer being paired with a type-2 individual over a type-1 individual. The intuition for this feature of partnerships is clear. The financial return to the partnership is half of the output produced jointly by the partners. All else equal, type-2 workers will be inclined to work longer hours, and produce more output, than type-1 workers.

Let V_{st} be the utility a type s individual gets from being in a partnership with a type t individual net of the utility of a job in the spot market. Then, using (3) and (4) it is easy to show that

$$(5) V_{st} = m_2^2 [1/16b_s + 1/8b_t] - w_1^2 / 4b_s.$$

Notice that given $b_1 > b_2$, we have $V_{22} > V_{21}$ and $V_{12} > V_{11}$. Any attorney will always prefer to be paired with a type-2 partner.

Given this set up, the value a partnership position depends crucially on the individual's type, and also on what type he thinks the other partner might be. From the viewpoint of a prospective partner, the higher the probability that the other partner is type-2, the higher will be the amount he will be willing to pay for a position in the partnership. This, in turn, will lead the current partners to put in place a mechanism that ensures it is common knowledge that all prospective buyers of the partnership are type-2 individuals.

2.2 Equilibrium with Observable Type

In this section we assume that firms know whether a worker is type-1 or type-2 in order to find a "baseline" complete information equilibrium. The set-up is simple. Each firm is presumed to have two partners who are attorneys in their second period. Firms employ L associates who

are first-period attorneys. At the end of each period the partners sell the firm to the two highest bidders among the junior associates in a competitive auction.¹⁰ This auction corresponds to the nearly ubiquitous practice of promoting the next cohort of partners from the firms current cohort of associates.¹¹

In equilibrium both types of attorneys accept positions in the spot market, earning wage $w_1 = m_1$. Only type-2 workers are offered positions as associates in the partnerships, however. The reason is suggested by our analysis above. As associates, the two types of individuals are perfect substitutes. Partners, however, are concerned not only about current production, but also about the future value of their firm. This value is maximized if type-2 workers exclusively are allowed to bid for the firm, and if it is common knowledge that this will be the firm's policy. Given the assurance that both partners will be type-2, the steady state market price of a partnership, X , will solve

$$(6) \quad X = V_{22} + \frac{X}{1+r}$$

where, using (5),

$$V_{22} = \frac{3m_2^2}{16b_2} - \frac{w_1^2}{4b_2}.$$

We assume V_{22} is positive; the existence of partnerships is efficient.¹²

- 10 In what follows we assume that the two highest bidders are certain to purchase the firm. Alternatively, the model can be expressed as a lottery in which the bidders purchase the firm with some probability less than 1. Introducing a lottery into our setup does not change our central conclusions about the nature of the labor market equilibrium or the determination of work hours.
- 11 In this model the auctioning of the law firm is a convenient device for ensuring that the current generation of partners has an interest in maximizing the discounted present value of future net income produced by the firm. The purchase of the firm by new partners is most easily imagined as an outright exchange of cash for equity and some firms do literally require partners to 'buy into the partnership'. The actual transaction, however, need not take this form and in most cases it does not. In our two period model, the new partners could 'purchase' the firm by accepting reduced salaries. If we complicated the model by allowing partners to stay for a number of periods, the purchase of the firm could take the form of a steep salary-tenure profile for partners.
- 12 This will be the case if the level of productivity in a partnership exceeds that of the spot market jobs by enough, i.e., if $m_2 > \sqrt{4/3}m_1$.

Notice that in this equilibrium, type-2 workers are indifferent between the various jobs available. Type-1 workers find positions in the spot market. Importantly, for our analysis, all attorneys work their preferred number of hours, with type-2 attorneys working longer hours than type-1.

2.3 Does Incomplete Information Change the Equilibrium?

In this section we ask if the full information equilibrium pertains when types are unobservable. We start by supposing that the equilibrium does exist; that is, we think about an equilibrium in which type-2 workers exclusively accept positions as associates and bid for partnerships, and all associates work optimal hours. We adopt the Rothschild-Stiglitz equilibrium concept: The full information equilibrium exists when no actor can increase utility by deviating from the behavior specified in the equilibrium, when this actor takes others' behavior as given.

We consider associates first. A type-2 worker clearly cannot benefit from accepting the jobs normally held by type-1 workers, which pay w_1 at hours h_1^* . Suppose, though, that a "maverick" type-1 attorney were to accept a job as a junior associate by pretending to be a type-2 individual. For this maverick, there would be a loss in utility in the first period, because she would be working longer hours than would be optimal. On the other hand, she could purchase a partnership for the second period of her career, at the going price of X , and be assured of getting paired with a type-2 individual. The cost to the maverick in the second period is just the opportunity cost of owning the partnership period for one period, $rX/(1+r)$, which from (6), is V_{22} . On the other hand, the benefit of being matched with a type-2 individual in a partnership is V_{12} .

If $V_{12} < V_{22}$, we do indeed have an incomplete information equilibrium that corresponds to the complete information equilibrium. This describes a "no envy" case. A type-I individual would not be interested in accepting a position held by a type-2 individual even if by doing so she could fool the employer into thinking she was a type-2 individual. A far more interesting case is

where $V_{12} > V_{22}$.¹³ In this instance it may increase the utility of a type-1 individual to adopt the maverick strategy. This "envy" case will occur when:

$$u_1(w_1 h_2^*, h_2^*) + \frac{V_{12} - V_{22}}{1+r} + \frac{u_1(w_1 h_1^*, h_1^*)}{1+r} > u_1(w_1 h_1^*, h_1^*) + \frac{u_1(w_1 h_1^*, h_1^*)}{1+r},$$

or equivalently, using (2), (3) and (5), if

$$(7) \quad \frac{w_1^2(b_2 - b_1)}{b_2} > \frac{-1}{(1+r)} [w_1^2 - (m_2/2)^2].$$

The right hand side of expression (7) must be negative (see footnote 13). Thus, if b_1 is not too much larger than b_2 , inequality (7) holds. Expression (7) gives us our first important result: There exist conditions under which it will be profitable for a type-1 worker to seek associate positions that are occupied by type-2 workers in the perfect information equilibrium. The full information equilibrium cannot pertain in this case.

Although the full information equilibrium cannot apply when inequality (7) holds, we might suspect that a market in which there were only a very few type-1 workers would achieve an equilibrium not very much different from the perfect information case. In particular, it may be that when short-hour attorneys are rare, the long hour attorneys might be still work the utility maximizing number of hours.

We can easily examine this proposed "equilibrium". Each partnership hires associates who they hope will be type-2 workers. These individuals work h_2^* hours in period 1, at the competitive wage w_1 . Then at the end of the period the firm is auctioned off to the highest bidders. Suppose that there are so few type-1 workers in the market that any one firm expects at most one type-1 worker, and the probability of this happening is θ , which is close to zero. So long as hours remain

13 This will occur if $2m_1 > m_2$. A tempting, but incorrect, interpretation of this inequality might be that the envy case is *less* likely in very rich firms where m_2 is large. To clarify this point, we note that in the case where there were P partners, $V_{12} > V_{22}$ when $Pm_1 > m_2$. We have not modeled the determinants of P in this paper. If, as seems reasonable, P were a concave function of m_2 , then the envy case would be *more* likely as m_2 increases.

at h_2^* , the value of the firm to each partner will suffer a small discrete decline, from X

$$= r V_{22}/(1+r) \text{ to } \bar{X} = r[(1-\theta)V_{22} + \theta V_{21}]/(1+r).^{14}$$

Again using the Rothschild-Stiglitz definition of equilibrium, we note that this outcome can be an equilibrium only if no actor has the incentive to alter their behavior. Consider though, a firm that increases by some small amount the number of hours it requires of junior associates. The new level of hours is $h_2^* + \Delta h$. Given that the product per hour of an associate is m_1 , the change in the firm's net income from the L associates will be

$$(8) \quad L[m_1 h_2^* - w_1 h_2^*] - L[m_1(h_2^* + \Delta h) - (w_1 + \Delta w)(h_2^* + \Delta h)] = -L\Delta w(h_2^* + \Delta h).$$

Of course if associates are being asked to work more hours than they consider optimal at w_1 , they must also be paid a higher wage, $w_1 + \Delta w$. How large must the change in wage be to induce associates to work these extra hours? Using the utility function specified in (1), we must have

$$(9) \quad (w_1 + \Delta w)(h_2^* + \Delta h) - b_2(h_2^* + \Delta h) = u_2(w_1 h_2^*, h_2^*)$$

where, from (2) and (3) respectively, we note that $h_2^* = w_1/(2b_2)$ and $u_2(w_1 h_2^*, h_2^*) = w_1^2/(4b_2)$.

Substituting these expressions into (9) and rearranging terms gives

$$(10) \quad \Delta w(h_2^* + \Delta h) = b_2(\Delta h)^2.$$

This in turn can be substituted into (8) to demonstrate that the change in the net income from the firm's associates due to the policy of increasing hours is $-Lb_2(\Delta h)^2$. This implies that firms suffer a decrease in net income as a result of their new hours policy, but this decrease is *second order*.

If this were the sole effect of increasing work hours, no single firm would have an incentive to require hours greater than h_2^* . However, a firm that extends its required hours also imposes a first order cost on any type-1 worker who wishes to work for the firm. Type-1 workers will therefore seek employment at the other firms who continue to offer positions with hours set to h_2^* . This means that a small increase in hours will ensure that the firm will have only

¹⁴ The change in firm value is $r\theta[V_{22}-V_{21}]/(1+r)$. Substituting from expression (5), we can express $V_{22}-V_{21}$ in terms of model parameters as $m_2^2[(b_2)^{-1} - (b_1)^{-1}]/8 > 0$.

type-2 workers in its associate pool. The net result is a discrete increase in the value of the firm that is described in footnote 14. For a small changes in hours, the increase in firm value *must* exceed the loss in net income. This leads us to our second major result: In situations where short-hour attorneys might wish to become partners in firms, any individual firm will benefit by increasing hours some amount above h_2^* . Put differently, in the “envy” case described by expression (7), the equilibrium *cannot* be characterized by partnerships in which all associates work the utility maximizing number of hours (conditional on the wage).

2.4 A Separating Equilibrium

Having ruled out a pooling equilibrium in which firms allow associates to work optimal hours, we turn to a description of an alternative separating equilibrium that can exist in a labor market with unobservable types. Figure 2 sketches the basic idea. If each type of attorney were to work optimal hours given productivity $m_1 = w_1$, hours for the two types of attorney would be h_2^* and h_1^* . We have already shown, however, that partnerships can benefit by setting hours high enough to discourage type-1 individuals from applying for associate positions. If partnerships offer the wage--hours package $(\tilde{w}_2, \tilde{h}_2)$ in Figure 2, type-2 individuals will accept such positions, but type-1 workers will not. Type-1 workers will not take such jobs because the loss of utility of accepting an associate position will equal any possible gain from access to a partnership.

More formally, we note that $(\tilde{w}_2, \tilde{h}_2)$ must be set so as to meet (1) the “participation constraint,” that type-2 workers are willing to take the jobs, and (2) the “separating condition,” that type-1 workers will not accept the positions. These two conditions are respectively expressed by the following expressions:

$$(11) \quad u_2(\tilde{w}_2, \tilde{h}_2) \geq u_2(w_1 h_2^*, h_2^*)$$

and

$$(12) \quad \frac{1}{1+r} \left(V_{12} - r \tilde{X}/(1+r) \right) \leq u_1(w_1 h_1^*, h_1^*) - u_1(\tilde{w}_2, \tilde{h}_2)$$

where \tilde{X} is the price of a partnership in the proposed separating equilibrium.¹⁵

Can this be an equilibrium? The crucial issue is if firms in the separating equilibrium prefer offering the wage--hours packages (\tilde{w}_2, \tilde{h}_2), as defined by (11) and (12), to simply abandoning the separating strategy and accepting the possibility of selling the partnership in the next period to type-1 workers.

Our first step is to find the value of the partnership, \tilde{X} , in the separating equilibrium. We let the firm choose \tilde{w}_2 and \tilde{h}_2 so that inequalities (11) and (12) are binding. Then substituting from (2), (3) and (5) into (11) and (12) we find after rearranging terms that

$$(13) \quad \frac{r\tilde{X}}{1+r} = \left\langle \frac{m_2^2}{16b_1} + \frac{m_2^2}{8b_2} + \frac{w_1^2}{4b_1} \right\rangle - (1+r) \left\langle \frac{w_1^2}{4b_1} - \frac{w_1^2}{4b_2} - b_2 \tilde{h}_2 - b_1 \tilde{h}_2 \right\rangle.$$

The next step is to observe that when it is common knowledge that future partners will be type-1, the value of the firm, say X' , must solve

$$(14) \quad \frac{rX'}{1+r} = V_{11} = \frac{3m_2^2}{16b_1} - \frac{w_1^2}{4b_1},$$

where the expression for V_{11} comes from (5).

The final step is to establish that \tilde{X} exceeds X' . To demonstrate see this last step, we note that the implication of (13) and (14) is

$$(15) \quad \frac{r}{1+r} (\tilde{X} - X') = \frac{m_2^2}{8} \left\langle \frac{1}{b_2} - \frac{1}{b_1} \right\rangle + (1+r) \left\langle \frac{w_1^2}{4} [b_2^{-1} - b_1^{-1}] + [b_1 - b_2] \tilde{h}_2^2 \right\rangle$$

The right hand side of (15) must be positive. A partnership operating in a separating equilibrium as shown in Figure 2 will *never* wish to abandon the separation strategy in favor of letting type-1 workers into its pool of associates.

We have thus demonstrated that in situations where short-hour attorneys might wish to become partners in the elite oligopolistic fringe of law firms, there can exist a separating

¹⁵ Note that $r\tilde{X}/(1+r)$ is just the opportunity cost of holding the partnership for one period.

equilibrium. In this equilibrium associates are required to work more hours than they would otherwise wish to work at the going wage.

2.5 Discussion

We have argued that the income sharing characteristic of partnerships creates strong incentives to screen potential partners for their *propensity* to work hard. When an associate's record of hours worked are used as an indicator in promotion decisions, it is easy to identify situations where associates are required to work more hours than they would if they were simply maximizing utility conditional on the current wage.

Our model of adverse selection in the determination of work hours need not be limited to professional partnerships. Rat race equilibria can be expected in any group where the following three criteria hold: (1) the members of a group benefit from the productive activity of other group members; (2) the output of the group can be significantly influenced by the work effort of individual members; and (3) members of the group have the ability to establish work norms. Criteria 2 suggests that adverse selection in hours may be particularly likely in groups using o-ring type production technology. In these groups complementarities among employees are such that small differences in an individual's level of performance can generate large differences in the value of output produced by the group.¹⁶ Teams of professionals developing new products with short product life cycles (e.g., software engineers) may therefore be especially likely to be characterized by excessive work norms.

Rat race effects might also appear in the competition for managerial positions in hierarchical settings where the actions of managers high up in the hierarchy have a multiplicative effect on output through their influence on employees lower down in the hierarchy (Rosen, 1982).

¹⁶ Kremer (1993) argues that "o-ring" production functions are ubiquitous and can account for a very long list of otherwise anomalous features of labor markets.

The separating equilibrium we identify is clearly inefficient relative to the full information case. Of more interest is the finding that the equilibrium can be inefficient even given information constraints. This point is most easily established if we consider the effect of a maximum hours law when the proportion of type-1 ("short-hour") workers in the economy (θ) is close to zero. A maximum hours law that prohibits hours in excess of h_2^* makes it impossible for firms to maintain a separating equilibrium. Type-1 attorneys are made better off by this law because they gain access to previously unobtainable partnerships that offer them higher utility than jobs in the spot market. Long-hour workers are indifferent to the passage of the law because they continue to receive reservation utility. Since type-1 associates are made better off and type-2 associates are indifferent to a maximum hours law, the separating equilibrium will be inefficient in cases where the law improves the position of the partners who currently own the firms.

The benefit of the maximum hours law to current partners derives from the fact they will no longer have to compensate type-2 associates for excessive work hours. The magnitude of this reduction in labor costs is independent of the actions taken by other firms or the proportion of type-2 attorneys in the labor force. The cost of the maximum hours law to current partners results from the firm's inability to screen out short hour associates whose presence reduces the value of the firm.

If a *single* firm abandons stringent work norms, it will be certain to attract only short-hour attorneys and we have already demonstrated that the costs of such a move will always exceed the benefits. Things are different, however, under a law compelling *all* firms to simultaneously abandon the separating equilibrium. In this case, the failure to screen out short-hour workers will reduce the value of the firm to each partner by $r\theta[V_{22} - V_{21}]/(1+r)$ (see footnote 14). Thus as θ falls towards zero, we are certain to encounter a situation where it is profitable for *all* firms to *simultaneously* reduce their work norms, but where no individual firm will have the incentive to undertake such a move. A maximum

hours law would, in this situation, make current partners better off without making any of the associates worse off.

Our separating equilibrium also has the property that increases in the number of short-hour attorneys will *not* lead to a shortening of associate hours in law firms. In the model specified above, the number of hours required of associates in law firms is invariant with respect to the proportion of the workforce desiring short hours. We can get even stronger results if we allow the wage in the self employment sector to fall as the number of short-hour attorneys increase. In this situation, the gain from pretending to be a long-hour attorney increases and firms will have to make the work norm more stringent to discourage short hour applicants. Thus firms may respond to an increase in the number of short hour attorneys by *increasing* the minimum number of acceptable work hours for associates.

A final feature of the separating equilibrium concerns the distribution of access to partnerships. In comparison to the hypothetical economy where excessive hours are limited by custom, the rat race equilibria offers reduced access to partnerships for attorneys who are unwilling to endure excessive work hours early in their careers.

3. An Empirical Investigation of Work Hours in Large Law Firms

The preceding section described how adverse selection in the competition for positions in legal partnerships could lead firms to require excessive work hours from associates. In this

section we report the results of an empirical investigation of the determination of associate work hours in large law firms.

3.1 The Data

We collected the data for this study in a survey of associates and partners at two major law firms in a large Northeastern city.¹⁹ The surveys asked all associates on a partnership track about their work hours, billable hours, and attitudes towards work hours. A total of 216 surveys were distributed and 133 were returned for a response rate of 62 percent. A simultaneous survey questioned the partners at these firms about the decision to promote associates to partners. We distributed 188 surveys and received responses from 64.4 percent of the partners in our sample.

Columns 1 and 2 of Table 1 present descriptive statistics for our sample of associates.²⁰ Rows 1, 2 and 3 compare the characteristics of respondents and non-respondents. We find that 57.1 percent of the survey respondents are male compared to 58.5 percent for the non-respondents. The average respondent graduated from law school in 1989 while the average non-respondent graduated in 1988. The average age of respondents is 31.8 years compared to 32.8 for non-respondents. None of the differences between respondents and non-respondents in rows 1-3 are statistically significant.²¹ This fact, combined with the high response rate, leads us to believe that our sample of respondents is fairly representative of the population of associates at work in these firms.

¹⁹ The survey was conducted during the Summer of 1993. Three waves of questionnaires were distributed at Firm 1 and, on the advice of management, two waves were distributed at Firm 2. The ultimate response rate at both firms were nearly identical.

²⁰ In order to conceal the identity of participating firms and survey respondents, we present averages pooled across both firms.

²¹ Data on the age and year of law school graduation was collected from the Martindale-Hubbel legal directory. This directory does not list all the associates in a firm. Even when an associate was listed in the directory, information about age was sometimes not included. In the end we learned the age of 44 out of the 83 non-respondents. Year of law school graduation was available for 47 non-respondents.

Rows 4-6 describe other characteristics of associates and their jobs. The average job tenure of associates in our sample is 3.6 years. On average 70.7 percent of the respondents are married or living with a significant other, and 32.6 percent had children. The average annual salary of associates is \$79,154.

Rows 8-13 present different measures of work hours. Rows 8a-8c present the distribution of billable and non-billable hours worked per month. Associates in the 25th percentile work 180 hours per month. The median associate works 200 hours per month. Associates in the 75th percentile work 220 hours per month. Rows 9a-9c present the distribution of monthly billable hours. The 25th percentile, mean and 75th percentile are respectively 150, 160 and 180 hours billed per month. The monthly hours figures in rows 8a-9c include both part-time and full-time attorneys. In our sample of 133 associates only 9 worked part-time (see row 10). All of these part-timers were women with children. The average monthly hours of these part-time women is 140.

Rows 11 and 12 present data on weekend work patterns. In an average week, 30.3 percent of the associates do not work weekends at all, 47.7 percent work half a weekend day, 20.5 percent work a whole day and 1.52 percent work one and a half weekend days. None of the associates surveyed worked two full weekend days during a typical week. During a busy week things are different. Only 0.76 percent do not work weekends during a busy week, 10.7 percent work half a day, 38.9 percent work a whole day, 26 percent work one and a half days and 23.7 percent work both weekend days.

3.2 Hours Preferences, Hours Worked and Promotion

One of the implications of the adverse selection equilibria that distinguish them from full information equilibria is the possibility that associates in law firms work more hours than would be utility maximizing given the wage.

Figure 2 suggests a simple strategy for investigating this “overwork” hypothesis. A type 2 individual would like to work h_2^* hours at the going wage, but will be required to work \tilde{h}_2 hours.

In principle, overworked employees could be identified by asking individuals whether they would like to reduce their current work hours given their current wage. If hours constraint are prevalent, however, this question would require respondents to consider a hypothetical option that they may not have anticipated when making their consumption plans. This means that employees who might otherwise desire shorter hours may previously have made financial commitments expecting an income level achieved only at the current (and excessive) level of work hours. These financial commitments (which include things like mortgage payments, car loans, and school tuition payments for children) would preclude a downwards adjustment in work hours at the current wage.

For these reasons we adopted an alternative approach to identifying overwork. Rather than asking how associates would adjust hours given their current wage, we asked how they would adjust hours in response to a small wage increase. The utility derived from such a wage increase is (from equation 1)

$$(16) \quad \frac{dU}{dw} = h_2^* + [w - 2b_2 h_2^*] \frac{dh_2^*}{dw}.$$

We know from the first-order conditions that the term in [] is zero at h_2^* . It follows that for small changes in the wage, the new level of utility is virtually identical if the individual optimally adjusts work hours or leaves work hours unchanged. If the costs of adjusting work hours are greater than the costs of adapting to an increase in income, a population of individuals at the utility maximizing level of hours should generally want to keep hours the same and take a wage increase in the form of an increase in income. This sort of “near rational” behavior should be observed even when, as in this case, dh/dw is non-zero. Things are different at \tilde{h}_2 . Here the expression in brackets will be negative and individuals can make themselves better off by reducing work hours.

With these relationships in mind, we asked associates to pick from 3 choices: (1) decrease hours by 5 percent with no change in income over the coming year, (2) keep hours the same over the coming year with a 5 percent increase in income, or (3) increase hours by 5 percent over the

coming year with a 10 percent increase in income.²² The results are reported in column 1 of Table 2. If most associates were working optimal hours, we would expect them to engage in “near rational” behavior and choose alternative number 2. Indeed we found that 25.56 percent of respondents indicated that they would like to keep their hours unchanged and enjoy a 5 percent increase in income. However, 65.41 percent of the associates indicated that they would prefer *reducing* work hours and keeping income unchanged over the coming year. This is the pattern we would expect in our adverse selection model where associates are at \tilde{h}_2 rather than h_2^* .

The “near rational” behavior described above will be most apparent where the costs of adjusting hours are high. Our case for excessive work norms would therefore be strengthened if we found that even among associates with high costs of hours adjustment, the majority would like to reduce work hours.

The need to care for young children creates obvious costs to adjusting work hours. Every additional hour of work requires finding an additional hour of child care. Reducing hours may also create additional child-care costs if, as is often the case, child care providers are not completely flexible with regard to the number of hours of child care per week. An attorney who changes from 50 to 45 work hours per week may not be able to reduce child care hours by 5 hours per week without changing to another provider. It seems reasonable, therefore, that associates with children should have higher costs of hours adjustment than other associates. Thus if associates are working the utility maximizing number of hours, we would expect the majority of associates with children to want to continue working the current number of hours.

Column 2 of Table 2 presents the responses of associates with children. As expected given the low average age in our sample, 34 of the 43 respondents with children had at least one child less than 6 years old. We find, however, that 60 percent of the associates want to reduce

²² The surveys also included a table describing what a 5 percent change in work hours would mean for associates working different hours. For example, an associate working 200 hours per month would learn from the table that a 5 percent change in hours would imply an increase or decrease of one eight hour day per month or 12 ~~eight~~ hour days per year.

hours. This figure is quite close to that found for the entire survey. Indeed, the hypothesis that the distribution of hours preferences was the same for associates with and without children could not be rejected at conventional significance levels.²³ Column 3 of Table 2 presents the results for associates who are married to spouses holding full-time jobs but who do not have children. More than 78 percent of these associates would use a 5 percent wage increase to reduce work hours. Column 4 presents the comparable results for associates who are married to partners working full time and who have children. We find that 76.19 percent of associates would respond to a wage increase by reducing work hours.²⁴ It thus appears that associates with high costs of hours adjustment are as likely as other associates to want to reduce work hours.

An alternative interpretation of Table 2 that is consistent with the conventional labor supply model is that, for unexplained reasons, a large proportion of associate lawyers have backwards bending labor supply curves. After all, economic theory does not require that individuals increase work hours in response to a wage increase. It therefore need not be anomalous to observe that some individuals respond to a wage increase by cutting back hours. Upon reflection, however, this interpretation seems implausible. Should we really believe that when associates receive their next year's wage increase they will begin cutting back their hours? To put this argument in some perspective, consider that associates in their fourth year at these firms have salaries roughly 30 percent above starting level associates with no appreciable decline in average hours.²⁵

²³ A Wilcoxon rank sum test of the null hypothesis that associates with and without children were drawn from populations having the same medians produces a z statistic of 0.554. Thus the null hypothesis cannot be rejected at conventional significance levels.

²⁴ Using a Wilcoxon rank sum test one cannot reject the hypothesis that the sample of associates in columns 3 and 4 of Table 2 were drawn from populations having the same medians. The z score produced by this test is 0.60.

²⁵ The effect of tenure on mean salaries was estimated by regressing the log of earnings on job tenure and years of prior legal experience. The coefficient on tenure was roughly 0.077 with a t-statistic greater than 11. In contrast, regressing various hours measures against the same two variables yielded a small and statistically insignificant coefficient on job tenure. These results were not

Table 3 presents descriptive statistics for associates wanting to reduce, keep the same, or increase hours of work. The "reduce hours" and the "keep the same hours" associates look very similar and in no case are the differences in the means across these groups statistically significant. Particularly noteworthy is the finding that the annual salaries across these two groups are the same (row 7). This casts further doubt on the backwards bending labor supply curve explanation, because the "income effect" implicit in the work hours question are likely to be the same across groups.

The "increase hours" group is a little bit different from the other two. In general they tend to have less legal experience prior to joining the current firm and therefore slightly lower average salaries. It is possible that associates in this group are trying to "catch up" to other associates in the firm by accumulating more experience. In any case, the number of associates in the "increase hours" group (9) is small.

If the high incidence of overwork recorded in Table 2 is indeed the result of the processes described by our adverse selection model, we should also find that work hours are an important indicator in the promotion to partnership decision. To address this issue, we examine the role of work hours in promotions in three different ways. First, we asked each attorney in the firm to indicate the importance of billable hours and other factors in determining promotion to partnership. Secondly, we asked each attorney the importance of hours billed as an *indicator* of qualities that the firm might look for in partners. Third, we conducted an experiment in which partners were asked to evaluate different hypothetical associates for promotion. We describe each of these investigations in turn.

Factors Important in Promotion: Respondents were asked to evaluate the importance of 12 different factors that were likely to play a role in the promotion process in these law firms. Importance was measured using a five point scale where 1 was not important, 2 was slightly

altered by the inclusion of other variables controlling for marital status, number and age of children, or gender.

important, 3 was moderately important, 4 was very important, and 5 was of the utmost importance. Table 4 lists the fraction of respondents who claimed that a factor had an importance of 4 or 5. Column 1 presents the results for associates and column 2 presents the results for partners.

It is clear from inspection that associates and partners have similar views about which factors are important in the promotion process. The correlation coefficient between the two columns in Table 4 is 0.992. The vast majority of associates (90 percent) and partners (99 percent) clearly view the quality of work product as important in promotion decisions. Willingness to work hard is also considered important by large numbers of associates (96 percent) and partners (89 percent). In contrast the number of hours billed to clients is seen to be important by a much smaller proportion of associates (68 percent) and partners (52 percent). Indeed, billable hours ranked 7th in importance for both associates and partners.

Hours as an Indicator Quite a different picture emerges when attorneys are asked about the importance of billable hours as an *indicator* of other traits and achievements relevant to the partnership decision. Respondents were asked to evaluate the importance of billable hours as an indicator for 5 of the 12 factors listed in Table 4. Attorneys who believe that billable hours are an important indicator and who also believe that the factor itself was important in promotion were assigned a value of 1 and zero otherwise.²⁶ Thus 46 percent of associates reported that the quality of work product was very important in promotion decisions *and* that partners assigned much importance to billable hours as an indicator of work product quality. The comparable figure for partners was 39 percent. It is clear from inspection of the two columns in Table 5 that similar proportions of associates and partners view hours as an important indicator of underlying associate abilities and accomplishments. The correlation coefficient between rows 1-5 of columns

26 The importance of hours as an indicator was measured by the same 5 point scale described in the previous paragraph. Hours were classified as an important indicator whenever the respondent indicated that they were *very important* (4) or of the *utmost importance* (5).

1 and 2 is 0.94. Consistent with our model of income sharing among partners, a large majority of associates (92 percent) and partners (78 percent) view billable hours as an important indicator of a willingness to work long hours when required. However, the signaling value of work hours is not limited to work propensities. In our sample of associates, the median number of important factors for which billable hours was also an important indicator was 3. The median for partners was 2.

Hypothetical Promotion Decisions: Our third approach to assessing the importance of work hours in promotion involved asking partners to evaluate hypothetical promotion cases. Each partner was randomly assigned to one of four different cases.

The first case asked the partner to evaluate George Davidson, an associate described as follows:

George Davidson has distinguished himself as a very capable lawyer. He has handled difficult cases, often with good results. In addition, George is a very hard working attorney. He volunteers for more work and can regularly be found at the office nights and weekends.

Although George is not the pre-eminent authority in his field, he has a bright and engaging style and is well liked by other lawyers. To date George has had little opportunity to demonstrate his ability to attract new clients to the firm and it is therefore difficult to assess his potential in this area.

The second case was identical to the first - but George Davidson became Sandra Davidson.

The third scenario added the following paragraph in between the two presented in cases 1 and 2.

George took a month of leave after the birth of his son. Upon returning to work, he stopped his practice of working nights and weekends and the result has been a marked reduction in his billable hours over the past three years. He has indicated that he would be interested in shifting to a reduced hour schedule if he should have a second child in the near future.

The fourth scenario was the same as the third, but George was changed to Sandra.

After reading their assigned case, partners were asked the likely degree of support they would give George (or Sandra) in an actual promotion decision. A follow up question asked what degree of support they would give if the candidate had demonstrated some ability to attract new clients.

The partners' assessments of the short and long hour job candidates are presented in Table 6. Columns 1 and 2 compare the degree of support George and Sandra received when they had not yet demonstrated that they have an ability to bring in new clients. It is clear work hours have an important effect on promotion decisions. When working long hours 1.72 percent of the partners indicate very heavy support and 31.03 percent heavy support for promotion. The figures for the short-hour equivalents are 0 percent and 17.54 percent respectively. Columns 3 and 4 report the reactions of partners when the associate demonstrates some ability to bring new clients to the firm. Looking across columns, it is clear that partner's increased their support for candidates with some ability to attract clients. It is also clear that hours continue to matter even for candidates who have some ability to bring in clients. For example, 20.34 percent of partners indicated that they would give heavy support to associates working long hours compared to 1.75 percent for short-hour associates.

A convenient way to summarize the results of the four scenarios is to estimate an ordered probit where the dependent variable is the partner's degree of support for promotion. The results of this exercise are presented in Table 7. Column 1 reports estimates when the candidate's ability to attract new clients is unclear and column 2 reports estimates when the candidate has demonstrated some ability to attract clients. The right hand side variables in the equations represent the dimensions along which the scenarios were allowed to vary. The statistically significant and positive coefficients on SHORT-HOUR CANDIDATE, in columns 1 and 2 indicates that support for promotion *falls* as work hours fall. Similarly the small and statistically insignificant coefficients on MALE CANDIDATE, means that gender per se had no direct effect on the partner's evaluation of associates.²⁷

²⁷ The importance of work hours documented in Table 7 is also reflected in a nationally representative survey of attorneys conducted by the American Bar Association. In this survey 59.3 percent of respondents believed that reduced hour or part-time employment limited opportunities for advancement including partnership (American Bar Association, 1991, p. 27).

3.3 How are Work Norms Communicated and Enforced?

Our model of adverse selection makes the case that large law firms have strong incentives to establish work norms entailing an inefficiently high number of hours. Consistent with this model, we report evidence that a substantial fraction of associates are overworked and that work hours are used as an indicator in the promotion process.

An important issue that we have so far ignored is the way in which firms communicate and enforce work norms. One possibility is to simply tell an associate that they must bill some minimum number of hours each month. A rule of this kind is attractive because it is easy to enforce and some firms do impose minimum billable hours requirements. Minimum billable hours requirements are problematic, however, because they do not take account of things that are beyond the control of the associates, e.g., a recession that reduces demand for legal (and other) business services. One of the two firms in our sample has an explicit minimum billable hours policy, but it is understood at this firm that acceptable performance requires hours substantially above this minimum.²⁸

An alternative and more flexible way to establish work norms is to scale the acceptable number of hours with respect to the average number of hours billed by associates in the firm. A firm can then tell associates that they are doing badly if they fall very far below the mean (or median) number of hours worked by associates. Indeed the firms in our study regularly distribute reports to partners on the billable hours of all associates in the firm.

To establish the role that the *distribution* of work hours plays in individual work hour decisions, we followed the question on work hours preferences presented Table 2 above with questions about shifts in the distribution of hours in the firm. Half of the associates were asked what their hours preferences would be if they knew that the majority of other associates in the

²⁸ A 1990 survey by the American Bar Association finds that written or unwritten billable hours requirements are widespread in larger private firms. The proportion of respondents working with no billable hours requirement increases as the size of the law firm falls (American Bar Association, 1991, Table 20 p. 22)

firm had *increased* their work hours by 5 percent. The other half of the associates were asked what their hours preferences would be if they knew that the majority of other associates in the firm had *decreased* work hours by 5 percent.

The answers to these follow up questions are presented in Table 8. The columns of the first panel of Table 8 presents an associate's preferred response to a 5 percent increase in wages. The rows of the table presents the same associate's preferred response once she is informed that the majority of other associates in the firm have *increased* their billable and nonbillable hours by 5 percent.

In a conventional labor supply model, individual work hours decisions are determined independently of the distribution of work hours of other associates in the firm. We should therefore expect all observations to lie along the diagonal of the table. In panel A we instead find that significant numbers of respondents would *increase* their desired level of work hours if they learned that others will do the same thing. Indeed the hypothesis that the distribution of original hours preferences is identical with the distribution of preferences when other associates increase work hours is strongly rejected.²⁹

Panel B of Table 8 is the same as Panel A except associates were asked to consider the possibility that the majority of other associates in the firm *reduce* their work hours by 5 percent. Here we also find that some associates reduce work hours when they believe others will do so as well. The response, however, is considerably smaller than that observed for an *increase* in hours. The hypothesis that the distribution of the row and column variables are the same cannot be rejected at conventional significance levels.³⁰ The number of attorneys reporting underwork or near optimal hours is small in our sample. We cannot, therefore, tell if the asymmetric response to

²⁹ A Wilcoxon sign rank test yields a z-statistic of -5.28.

³⁰ A Wilcoxon signed-rank test of the hypothesis that the two distributions are identical yields a z statistic of 1.28.

changes in the firm's hours distribution is due to different responses to upward or downward shifts in the hours distribution or due to our small sample size.

An alternative interpretation of the results in Table 8 might revolve around the problem of coordinating the activities of groups of attorneys. If attorneys work in teams requiring face to face contact among attorneys, then a 5 percent increase in one attorney's hours would *require* other group members to also increase hours 5 percent. Our survey evidence does not allow us to directly assess the importance of these types of coordination issues. It is worth noting, however, that associates in large firms are commonly spend a substantial proportion of work time on legal research and writing. This type of activity consists in large measure of solitary library work and is unlikely to require substantial face-to-face contact among attorneys.³¹

3.4 Discussion

The prediction that employees overwork early in their career is not unique to adverse selection models. Agency models in which firms back load compensation to elicit high levels of work effort from employees can also produce a similar pattern (see Lazear, 1981; and Kahn and Lang, 1992).³² The agency explanation may be particularly relevant in the context of law firms. Economists and legal scholars frequently interpret the up-or-out promotion practices of these

³¹ To get some idea of the disposition of associate work time, we analyzed the survey of lawyers described in the American Bar Associate report, The State of the Legal Profession 1990. This survey contains information on the use of work time for 68 associates in large private firms (i.e. those with more than 90 attorneys). The associates were asked what percent of work time they spent on various activities. Responses were grouped into five categories: 0-5 percent, 6-20 percent, 21-49 percent, 50-74 percent and more than 75 percent. Assigning each respondent to the mid-point of their category, we find that the mean associate in large firms spent 28 percent of work time on research/memo writing and 20 percent of work time drafting instruments.

³² Holmström (1982) shows that signaling models can also generate rat race equilibria in which professional and managerial employees overwork early in their career. His model is similar in spirit to our adverse selection model. It differs in that, like all signaling models, the hidden information (e.g., propensity to work hard) is held by the same party that determines the use of the indicator (here work hours). Holmström's goal was to demonstrate that introducing reputation into a dynamic labor market model will not eliminate the labor market distortions resulting from imperfect information. To make this point more strongly, Holmström assumes that markets will, over time, learn the true characteristics of the individual employee and set wages accordingly.

firms as an incentive compatible means of inducing associates to post performance bonds in the form of deferred compensation (Gilson and Mnookin, 1989). As an empirical matter, the amount of deferred compensation in large law firms is substantial (Rebitzer and Taylor, 1992).

Adverse selection and agency problems are not mutually exclusive. Firms trying to keep short-hour attorneys out of partnerships through long hour norms may also back load compensation with an eye towards increasing the incentives of long-hour associates to work hard or to invest in specific human capital. It should be noted, however, that the economic significance of overwork in the agency model is different than in the adverse selection model. In the agency context, the overwork that results from back loading compensation is *efficient* with respect to information constraints. Moreover, firms will be indifferent between hiring equally productive short and long-hour workers, even though both types of workers will overwork early in their careers. Evidence of widespread overwork is therefore necessary but not sufficient to establish the claim that law firms are inefficient and sluggish in providing jobs suited to short-hour employees. The simplest version of the agency model does not require that employers prefer long or short hour workers. Our findings that partners are more willing to promote long hour than short-hour associates offers some additional support for adverse selection.

Our finding of widespread overwork among associates is contrary to the results reported in other studies using data from large scale surveys of workers in the United States and Canada (Kahn and Lang, 1991 and 1992).³³ One explanation for this discrepancy is that large scale surveys do not offer a sufficiently detailed look into the structure of professional and managerial

³³ Kahn and Lang (1992) analyze the hours preferences of non salaried, working heads of households ages 25-54 in the Panel Study of Income Dynamics. They find that 41 percent of their sample would prefer to work more hours if more work were available. Only 4 percent would prefer to work less. Better information on desired work hours is available from the Survey of Work Reduction supplement to the Canadian Labor Force Survey. Using this data Kahn and Lang (1991) find that for nonunion men, 40.6 percent want to work more hours, 45.5 percent want their current hours; and 13.8 percent want fewer hours. The figures for women were 32 percent wanting more hours, 51.1 percent wanting the same hours and 16.9 percent wanting reduced hours (Kahn and Lang, 1988, Table 2). Interestingly Kahn and Lang find some evidence that the ratio of actual to desired work hours increases in higher wage and education groups.

employment relationships. In law, for example, one would not expect to see overwork reported among lawyers in solo practice or in government jobs.

An alternative explanation for the low incidence of overwork reported in large scale surveys concerns the way that the critical questions on desired work hours are posed. In both the U.S. and Canadian surveys, employees were essentially asked if they would, at their current wage level, like to work more or less hours than they are currently working. If hours constraints are prevalent, this question puts employees in the position of responding to a hypothetical choice that they may not have anticipated when making their consumption plans. This means that employees who might otherwise desire shorter hours may previously have made financial commitments expecting an income level achieved only at the current (and excessive) level of work hours. These financial commitments (e.g., mortgage payments, car loans, and school tuition payments) would preclude a downwards adjustment in work hours at the current wage. In contrast, the question posed in our survey allows associates to adjust work hours conditional on a wage 5 percent higher than their current wage. This wage increase is presumably closer to the wage anticipated by employees in previous periods and therefore gives more scope for a downwards adjustment in work hours.

4. Conclusion

This paper makes the case for the importance of adverse selection models to the determination of work hours in managerial and professional employment relationships. The focus of our empirical investigation is been law firms. We argue that the income sharing that is characteristic of legal partnerships creates incentives to, all else equal, promote those associates with the greatest propensity to work hard. Since this propensity is unobservable, law firms will use indicators of this propensity for the purpose of selecting associates for promotion to partnership. In particular, law firms rely upon an associate's record of billable hours.

Using a simple model, it is easy to find instances where these practices lead to the imposition of work norms entailing inefficiently long work hours. In such cases, firms will also not adjust work norms in response to an influx of employees desiring short hours.

We test the implications of our model using survey data from two large law firms. We find evidence that large numbers of associates work too many hours. In addition, both associates and partners view billable hours as an important indicator in promotion decisions. The response of partners to hypothetical promotion scenarios supports this conclusion as well.

Law firms differ from other professional service providers in that the indicator used in promotion decisions is denominated in terms of hours. It is important to note that there is nothing in our model that requires indicators have this characteristic. All that is needed from an indicator in order to generate overwork is that the indicator be an *increasing* function of work hours. Thus rat race equilibria should occur among associates in major consultancies, even though clients are billed by the project rather than the hour.

Our model of adverse selection is not limited to professional partnerships. Among groups of co-equal employees in other organizations, rat race equilibria can be expected wherever (1) the members of a group benefit from the productive activity of other group members; (2) the output of the group can be significantly influenced by the work effort of individual members; and (3) members of the group have the ability to establish work norms. Thus, we might expect rat race equilibria to be observed in academic departments of research universities where tenured faculty benefit from the research reputation of other members of their department. We would also expect adverse selection in hours to occur in work groups where complementarities are such that small differences in an individual's level of performance can generate large differences in the value of output produced by the group (Kremer 1993). Teams of professionals developing new products with short product life cycles (e.g., software engineers) may therefore be characterized by excessive work norms. Rat race effects might also appear in the competition for managerial positions in hierarchical settings where the effects of managerial effort high up in the hierarchy

have a multiplicative effect on output through their influence on employees lower down in the hierarchy (Rosen, 1982).

The discussion so far has emphasized the efficiency consequences of adverse selection in the determination of work hours. We close by returning to a distributional issue we briefly raised in section two. Partnership in the large law firms we study are the elite positions in the legal profession. Not only do partners in large firms earn more money than other attorneys (Rebitzer and Taylor, 1992), they also constitute the source of much of the leadership in the profession. The same is likely to be true in other settings where adverse selection is important. It follows then that, relative to situations where hours are limited by custom or law, rat race equilibria reduce access to powerful positions for those unwilling to tolerate excessive work hours early in their careers. This selection process may have the effect, although not the intent, of keeping a disproportionate number of qualified women out of leadership positions in business and professional organizations.³⁴ It is also possible that the male and female professionals who emerge victorious from a rat race are those who are personally least well equipped to address the consequences that shifting demographics have for professional and managerial employment relationships. The consequences of this selection pressure for the adaptability of organizations is an important question not yet addressed in the economics of professional and managerial labor markets.

³⁴ This gender effect results from the current fact that women bear the lion's share of non-market activities continues. For comparisons of the time men and women spend in non-market work activities see Fuchs (1986), Leete-Guy and Schor (1990), and Justin and Stafford (1991).

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Table 1
DESCRIPTIVE STATISTICS OF ASSOCIATES INCLUDED IN THE SURVEY

	Respondents	Non-respondents
(1) Percent Male	57.1 %	58.5%*
(2) Mean Year Graduated Law School	1989	1988*
(3) Mean Age (years)	31.8	32.8*
(4) Mean Tenure (years)	3.6	
(5) Percent Married	70.7%	
(6) Percent With Children	32.6%	
(7) Mean Annual Salary	\$79,154	
(8) Hours Worked Per Month:		
(a.) 25th Percentile	180	
(b.) 50th Percentile	200	
(c.) 75th Percentile	220	
(9) Hours Billed Per Month:		
(a.) 25th Percentile	150	
(b.) 50th Percentile	160	
(c.) 75th Percentile	180	
(10) Percent Working Part-time	6.8%	
(11) % Working Weekend Days in an Average Week:		
(a.) 0 days	30.0%	
(b.) 0.5 days	47.7%	
(c.) 1 days	20.5%	
(d.) 1.5 days	1.52%	
(e.) 2 days	0%	
(12) % Working Weekend Days in an Busy Week:		
(a.) 0 days	0.76%	
(b.) 0.5 days	10.7%	
(c.) 1 days	38.9%	
(d.) 1.5 days	26.0%	
(e.) 2 days	23.7%	

* data from Martindale Hubbel Legal Directory.

Table 2

HOW ASSOCIATES WOULD CHOOSE TO USE A HYPOTHETICAL 5% WAGE INCREASE

	Associates All	Associates With Children	Married Associates Whose Spouses Work Full time No Children	Married Associates Whose Spouses Work Full time With Children
1. <i>to reduce billable and non-billable work hours by 5% with no change in annual salary.</i>	65.41% (87 associates)	60.47% (26 associates)	78.57% (33 associates)	76.19% (16 associates)
2. <i>to continue working the same number of hours with a 5% increase in annual salary.</i>	25.56% (34 associates)	25.56% (13 associates)	9.52% (4 associates)	23.81% (5 associates)
3. <i>to increase billable and non-billable work hours by 5% with a 10% increase in annual salary.</i>	9.02% (12 associates)	9.02% (4 associates)	11.90% (5 associates)	0.00% (0 associates)
Total Observations	133	43	42	21

Table 3
CHARACTERISTICS OF ASSOCIATES BY HOURS PREFERENCES

Associate Would Choose to Use 5% Wage by:

	(1) Reducing Hours 5%	(2) Keeping Current Hours	(3) Increasing Hours 5%
(1) Percent Male	52.9%	64.7%	66.7%
(2) Mean Year Graduated Law School	1989	1989	1990**
(3) Mean Age (years)	32	31.8	29.8 *
(4) Mean Tenure (years)	3.1	3.0	2.2
(5) Percent Married	73.6%	58.8%	83.3%
(6) Percent With Children	30.2%	38.2%	33.3%
(7) Mean Annual Salary	\$80,264	\$80,053	\$72,645**
(8) Mean Hours Worked Per Month	198	199	204
(9) Mean Hours Billed Per Month	164	160	169
(10) Percent Working Part-time	5.8%	8.8%	8.3%
(11) Weekend Days Worked: Average Week.	0.5 days	0.4 days	0.6 days
(12) Weekend Days Worked: Busy Week.	1.3 days	1.3 days	1.4 days

** difference from column 1 significant at 5% level.

* difference from column 1 significant at 10% level

Table 4

FRACTION OF ASSOCIATES AND PARTNERS WHO CONSIDER
THE FOLLOWING FACTORS VERY IMPORTANT FOR PROMOTION TO PARTNERSHIP¹

Factor in the Promotion Decision:	Associates	Partners
<i>The quality of work product.</i>	0.90	0.99
<i>The number of hours billed to clients.</i>	0.68	0.52
<i>The mastery of an important area of specialization.</i>	0.67	0.75
<i>Contribution to administration or recruitment.</i>	0.08	0.01
<i>The development of good working relationships or mentoring relationships with senior lawyers in the firm.</i>	0.68	0.51
<i>The development of a good working relationship with clients and peers.</i>	0.76	0.81
<i>The potential for bringing new clients and business to the firm.</i>	0.75	0.69
<i>Demonstrated ability to bring new clients and business to the firm.</i>	0.48	0.19
<i>A willingness to work long hours when required</i>	0.96	0.89
<i>Loyalty to the firm</i>	0.69	0.71
<i>A willingness to pursue the interests of clients aggressively</i>	0.76	0.76
<i>Ambition for success in the legal profession</i>	0.67	0.51
Total Observations	130	118

¹ Respondents were asked to rate factors on the following 5 point scale: 1= not important; 2=slightly important; 3 = moderately important; 4= very important; and 5 = of the utmost importance. The table lists the fraction of respondents who rated the factor 4 or above.

Table 5

FRACTION OF ASSOCIATES AND PARTNERS WHO
 CONSIDERED BILLABLE HOURS AN IMPORTANT INDICATOR OF
 A FACTOR VIEWED AS IMPORTANT FOR PROMOTION.¹

Factor in the Promotion Decision	Associates	Partners
<i>Ambition for success and respect in the legal profession.</i>	0.46	0.39
<i>A willingness to pursue the interests of clients aggressively.</i>	0.48	0.37
<i>A willingness to work long hours when required.</i>	0.92	0.78
<i>Degree of loyalty to the firm.</i>	0.5	0.28
<i>The ability to produce high quality work product.</i>	0.32	0.32
<i>The ability and willingness to bring new clients into the firm.</i>	0.16	0.20
Median number of important factors for which hours are an important indicator.	3	2
Total Observations	130	117

¹ Respondents were asked to rate the importance of billable hours as an indicator for six different factors in the promotion process. A five point scale was used to record responses. In this scale: 1=not important; 2= slightly important; 3=moderately important; 4=very important; 5= of the utmost importance. Billable hours were seen as an important indicator when two conditions held. First, respondents gave billable hours a score of 4 or 5 as an indicator. Second the factor which was being indicated by billable hours was given an importance rating of 4 or 5 in the previous table.

Table 6

DEGREE OF SUPPORT FOR A HYPOTHETICAL CANDIDATE FOR PROMOTION TO PARTNER

Degree of Support	Ability to Attract Clients Is Unclear		Some Demonstrated Ability to Attract Clients	
	Long Hours	Short Hours	Long Hours	Short Hours
Very Heavy Support	1.72%	0%	20.34%	1.75%
Heavy Support	31.03%	17.54%	38.98%	35.09%
Moderate Support	53.45%	56.14%	35.59%	50.88%
Little Support	10.34%	22.81%	3.39%	10.53%
Very Little Support	3.45%	3.51%	1.69%	1.75%
Column Total	100.00%	100.00%	100.00%	100.00%
Number Observations	58	57	59	57

Table 7

ORDERED PROBIT ESTIMATES OF THE DETERMINANTS OF
SUPPORT FOR A HYPOTHETICAL CANDIDATE FOR PROMOTION TO PARTNER
(t-statistics)

	Ability of Candidate to Attract Clients is Unclear	Candidate Demonstrated Some Ability to Attract Clients
Dependent Variable:	Support for Promotion ¹	Support for Promotion ¹
Short-Hour Candidate	0.45 (2.16)	0.65 (3.16)
Male Candidate	0.02 (0.11)	-0.01 (-0.06)
N	115	116
χ^2	4.70	10.25

¹ Support was recorded in a 5 point scale where: 1=very heavy support; 2= heavy support; 3= moderate support; 4= little support and 5= very little support.

Table 8

CHANGES IN HOURS PREFERENCES OF ASSOCIATES
AS THE DISTRIBUTION OF HOURS IN THE FIRM SHIFTS

Original Hours Preferences:¹

Preferences When Others Increase Hours ²	Reduce Hours 5%	Keep Current Hours	Increase Hours 5%
Reduce Hours 5%	51.35%	0%	0%
Keep Current Hours	35.14%	35.71%	0%
Increase Hours 5%	13.51%	64.29%	100.00%
Column Total	100%	100%	100.00%
Number of Observations	37	14	6

Original Hours Preferences:¹

Preferences When Others Reduce Hours ³	Reduce Hours 5%	Keep Current Hours	Increase Hours 5%
Reduce Hours 5%	100.00%	15%	0.00%
Keep Current Hours	0%	85%	16.67%
Increase Hours 5%	0%	0%	83.33%
Column Total	100%	100%	100.00%
Number of Observations	50	20	6

¹ How associate would choose to respond to a 5% wage increase.

² How associate would choose to respond to a 5% wage increase if the majority of other associates in the firm increased hours by 5%.

³ How associate would choose to respond to a 5% wage increase if the majority of other associates reduced hours by 5%.

Figure 1

HOURS FOR TYPE 1 AND TYPE 2 ATTORNEYS IN
THE FULL INFORMATION EQUILIBRIUM

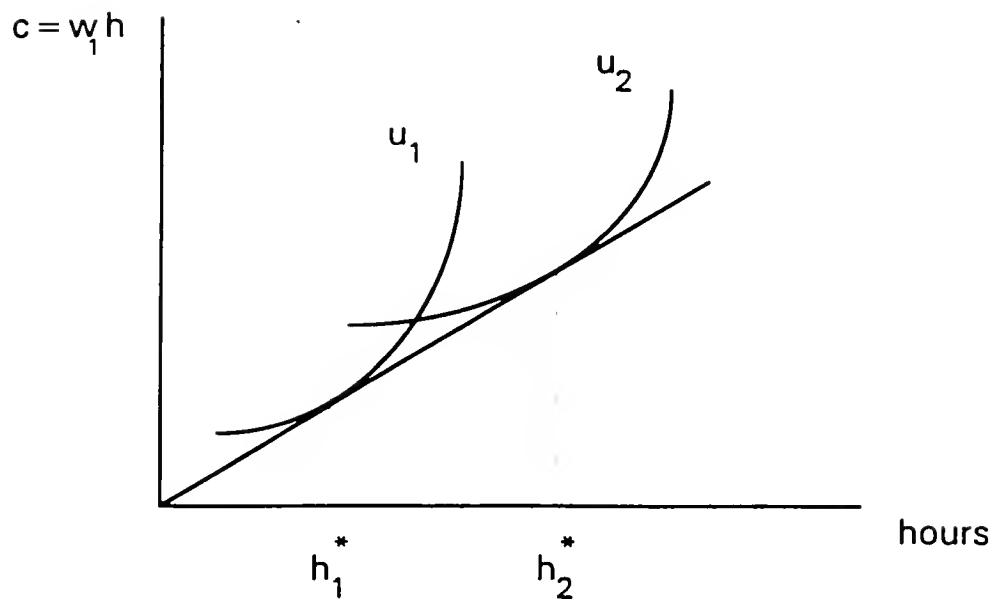
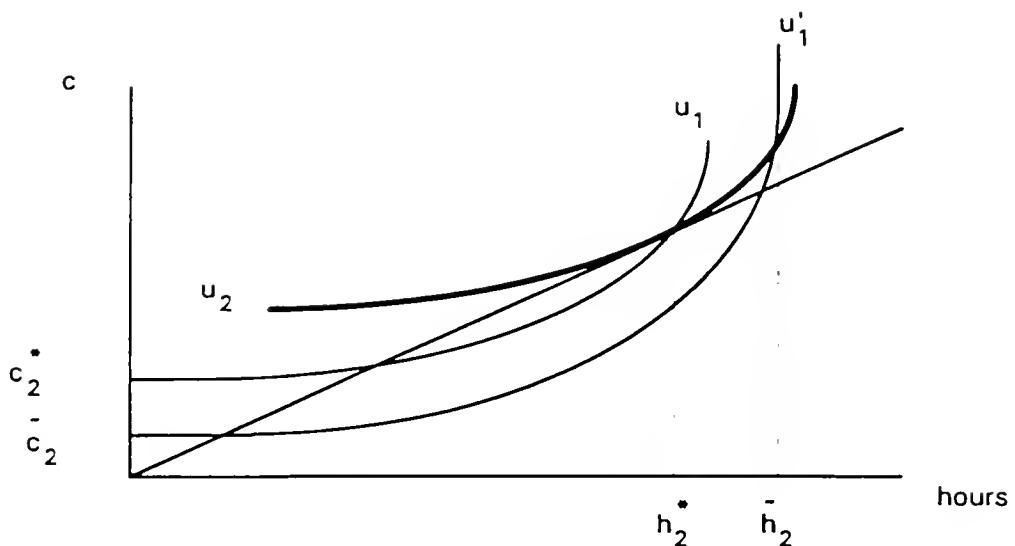


Figure 2

HOURS FOR ASSOCIATES IN
THE SEPARATING EQUILIBRIUM



$$\frac{v_{12} - v_{22}}{1+r} = c_2^* - c_2^-$$

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